Before the
Federal Communications Commission
Washington, D.C.

In the Matter of Implementation of Section 255 of the Telecommunications Act of 1996 Access to Telecommunications Services, Telecommunications Equipment, and Customer Premises Equipment by Persons with Disabilities	WT Docket No. 96-198

To: The Commission

Comments of the American Foundation for the Blind
October 28, 1996

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Executive Summary

For people who are blind or visually impaired, the ability to access and use new information technology is key to independence and the equal opportunity to participate in education, employment, the economy, civic affairs and social life. Unfortunately, much of the information technology being developed is designed without consideration for the needs of people who are blind or visually impaired. The personal computer was made accessible; new communications technology can be designed to take advantage of its power and flexibility in order to incorporate access for a wide range of users with different needs and capabilities.

In adding disability access requirements to the Telecommunications Act, Congress and the President took the first significant step toward ensuring that people with disabilities can be equal participants in, and derive the benefits of, the revolution now taking place in telecommunications technology. Now, the Commission must take action to ensure that the straightforward and future-oriented disability access provisions are implemented by the manufacturers and service providers who are bringing about this new revolution.

The Commission is responsible for enforcing the disability access provisions with respect to telecommunications carriers and other providers of telecommunications services, and all manufacturers of telecommunications equipment and customer premises equipment. Telecommunications services covers a broad range of services including enhanced services. Equipment refers to telecommunications devices as well as the user interface and software necessary to operate such devices.

Commission regulations are necessary to ensure that all covered manufacturers and service providers compete on a level playing field and that accessibility for individuals with disabilities is considered a priority. Clear rules setting forth the expectations of the Commission will ensure that both consumers with disabilities and the industry understand how these requirements will be implemented and enforced.

In handling complaints brought under Section 255, the Commission should set forth a series of steps or procedures in order to encourage industry action to comply with disability access requirements. These procedures would serve as a guide which may be followed by industry to foster the development of accessible telecommunications devices or services, or potentially, a series of defenses which may be cited in responding to a complaint alleging inaccessibility. Implementation activities are expected throughout all stages of product or service design and development through marketing, customer support and product/service revisions. Complaint procedures should recognize that the burden of proof must lie with covered entities to show a consideration of all feasible alternatives and present clear and comprehensive arguments for the actions taken with respect to disability access.

The term "readily achievable," which incorporates factors from the Americans with Disabilities Act, is the only exemption or limitation on the accessibility obligation included in Section 255. The Commission must strictly interpret this exemption to prevent pernicious use by companies resistant to disability access. Design costs in particular should be examined carefully since the history of technology innovation shows that per unit costs decline dramatically as a market is

developed. In addition, the cost of accessible features or functions will likely be nominal and offset by the enhanced value or usability of a product or service for consumers without disabilities.

Introduction

The mission of the American Foundation for the Blind is to enable persons who are blind or visually impaired to achieve equality of access and opportunity to all aspects of society. AFB accomplishes this mission, in part, by taking a national leadership role in the development and implementation of public policy and legislation. AFB staff were highly involved in efforts to advocate for specific provision in the Telecommunications Act of 1996 to ensure access to telecommunications technology for people with disabilities.

The disability access provisions established in the Telecommunications Act of 1996, provide the Federal Communications Commission (the Commission) with an unprecedented opportunity to ensure that a substantial segment of the American public, people with disabilities, have equal access to telecommunications technology. For the first time, the telecommunications industry must take steps to ensure that commercially sold technological products and services are usable by consumers with disabling conditions. In his statement accompanying the Notice of Inquiry on Section 255, Chairman Hundt states, "The statute makes clear that the 40 million Americans with disabilities are entitled to share fully in the benefits of the telecommunications services and equipment that are becoming such an essential element of our educational, social, political and economic future."

Currently, millions of Americans who have visual impairments cannot independently read standard printed material such as a newspaper or a government notice. The inadequacy of public transportation prevents people who are blind from independently and conveniently traveling to libraries, book stores, schools, and the workplace. If access to information technology is assured, Americans with disabilities would then be free to exercise their talents and creativity as full participants in society. Americans who are blind or visually impaired eagerly look forward to the enhanced opportunities for education, employment, civic participation, entertainment and independence that will result from access to information technology.

We have already seen a measure of the independence and opportunity that can be unleashed with information technology. The development and proliferation of the DOS-based personal computer, along with the advent of text-based commercial on-line services such as CompuServe and the rapid growth of the Internet led to profound improvements in the independence and productivity of people who are blind or visually impaired.

According to the latest results from an ongoing survey of World Wide Web users conducted by Georgia Institute of Technology (http:/www.cc.gatech.edu/gvu/user_surveys/survey-04-1996), 8% of users report having disabilities. Almost half of those with disabilities (3.7% of the total) report having visual impairments. This number may be somewhat higher if those who identified themselves as multiply-handicapped also have visual impairments. All other types of disabilities were reported at less than 1%. In addition, according to research conducted by the American Foundation for the Blind for the Department of Education, blind and visually impaired people are

as likely as the general population to have consumer electronics in their homes, to use personal computers, and to use Internet and on-line services. This, despite the fact that blind persons tend to be poorer, on average, than the general population, and tend to be employed much less often (McNeil, 1993). Since studies have shown that computer users and Internet users tend to have higher income than the general population and that people tend to use computers and the Internet at work, it is particularly noteworthy, given these differences in income and employment, that usage rates for blind and visually impaired persons are similar to the general population, suggesting the increased importance of this access to them. It is important to note that this breakthrough was achieved only because assistive technology was developed to work with the PC so that text and other information (represented as numbers in the ASCII code) was as readily "spoken" by an artificial voice as it was displayed on a video monitor, or directed to a Braille printer nearly as conveniently as to a standard print device. For several years, blind or visually impaired individuals were able to use specialized assistive technology to use the PC and gain access to such services as bulletin boards, the Internet, and some on-line services. They could read government documents, electronic books, newspapers, and restaurant lists independently and conveniently or compare products, make purchases, or even exchange letters with sighted peers. In addition, and even more importantly, access to DOS-based computer information and communications networks opened up employment opportunities for blind or visually impaired persons never realized before. A study completed just before the passage of the Americans with Disabilities Act (ADA) estimates that 43 percent of employed persons who are blind or visually impaired use computers to write. (Kirchner, Corinne and Harkins, Don, *Issues and Strategies Toward Improving Employment of Blind or Visually Impaired Persons in Illinois*, American Foundation for the Blind, 1991, Table VI-5 (a).)

In a host of ways, from the mid 1980's through the early 1990's, telecommunications networks and services were the most efficient, and often, the only way for people who are blind or visually impaired to obtain access to much of the information and many of the services commonly available in a variety of non-technological ways to the vast majority of individuals who are not disabled.

In recent years, communications technologies have converged into increasingly powerful, multi-purpose and flexible telecommunication devices and services. These devices combine numerous communication and information storage functions previously accomplished separately with such technologies as telephones, fax machines, computers, television, radio, microfiche, personal organizers, and pagers. Sometimes the information device (or appliance) contains the capabilities and sometimes it derives its functionality from software available in a telecommunications network. As Commissioner Ness mentioned in remarks last February, "The telephone network is now a web of thousands of powerful special purpose switching computers, which link literally millions of phones, faxes and personal computers at home and at business. The Internet--known only to a few a decade ago, is now a household word and a household window to the world." (Remarks of Commissioner Susan Ness, the Public Policy Forum Series, The Wharton School of the University of Pennsylvania, Philadelphia, Pennsylvania, February 22, 1996)

Similarly, as noted by Chairman Hundt in the Annual Report of the Disabilities Issues Task Force dated April 26, 1996: "Each day, many of us listen to the radio, fax a document, place dozens of telephone calls, surf the Internet, and watch several hours of television. These services have

become so much a part of our society that we cannot imagine life without them. In fact, most of us could not perform our jobs without them . . . . The opportunities of the communications revolution are limitless; and there should be no limits placed on those opportunities." Just as computers and the Internet have come to play an indispensable role on the job, in education and entertainment, the ability to use new telecommunications technology will be an indispensable part of our life in the 21st century. The evolving information superhighway will prove to be far more than a mere luxury or trendy alternative form of communications. The ability to use this technology is rapidly becoming the new literacy challenge. For people who are blind or visually impaired, the stakes of access to and use of new information technology are enormous.

Despite the importance of technology to people who are blind or visually impaired, most mass market information technology is designed without consideration for their needs. Popular technological innovations such as graphic symbols, "point-and-click" remote control features, interactive services, and devices with touch-sensitive screens are creating roadblocks for individuals with impaired vision. Inaccessible computer hardware and software and information networks are an added deterrent to the employment of blind or visually impaired people. The advent of graphical user interfaces, for example, has resulted in the loss of employment by blind persons. (See Appendix A, "Computer Icons Block Access for the Blind," The Wall Street Journal, August 14, 1996,) Inaccessible computer hardware and networks have also been the subject of articles or interviews appearing in the New York Times, National Public Radio, and the Boston Globe. (See Appendix A)

In adding Section 255 to the Communications Act, Congress and the President ensure that people with disabilities can fully participate in, and derive the benefits of, the new information revolution. This new section is straightforward and future-oriented, stressing the need for and value of broader and more innovative designs in information technology appliances and services which take full advantage of the power and flexibility of technology.

Referring to the disability access provisions, the accompanying Senate Committee Report states:

> "The Committee recognizes the importance of access to communications for all Americans. The Committee hopes that this requirement will foster the design, development, and inclusion of new features in communications technologies that permit more ready accessibility of communications technology by individuals with disabilities. The Committee also regards this new section as preparation for the future given that a growing number of Americans have disabilities."

We believe the Committee Reports accompanying Section 255 clearly indicate that Congress intended the access provisions to apply broadly to communications technology. We are equally convinced that the best means to accomplish the intent of this Section is through an active and honest partnership between industry, government and the disability community in which all sides commit themselves to technological innovation, market-based competition and access for the widest possible range of consumers. The Commission itself recognized the importance of access to the new frontier of telecommunications products and services by people with disabilities when it established the Disabilities Issues Task Force in 1995 under the direct supervision of Chairman Hundt.

Universal design is often invoked as a rationale for industry to take action to improve access to information technology. Universal design stresses the value of designing technology to reflect the needs of the widest possible user base. This is increasingly important as our society changes and disabling conditions become more common as a result of advances in health care and the related likelihood of living longer and surviving major illnesses and injuries.

In 1990, an estimated 1.7 percent of the U.S. population, or 4.3 million Americans, were severely visually impaired to the extent that they reported they could not see to read ordinary newsprint even when wearing glasses or contact lenses. (Nelson, K. A. and Dimitrova, G., "Severe Visual Impairment in the united States and in Each State, 1990, Journal of Blindness and Visual Impairment, 1993, pp. 80-85) Assuming that the rate of severe visual impairment for each age remains constant, by the year 2030 the number of severely visually impaired Americans is projected to increase by 107 percent. (American Foundation for the Blind) This increase will occur because the proportion of the population in the older age groups--those most likely to have visual impairments--is projected to increase most rapidly.

II. Threshold Jurisdictional Issues

In paragraph 7 the Commission seeks comment regarding approaches to enforcement of Section 255 and suggests various options including the promulgation of rules, under Section 4(I) of the Communications Act.

The Commission should promulgate comprehensive, flexible, and future-oriented rules in order to implement Section 255. The requirement for disability access is new to the industry and far-reaching in its implications. The telecommunications industry must be made aware of the importance of this new obligation. Clear rules regarding the expectations of the Commission must be set forth in order to ensure that both consumers with disabilities and the industry understand how these requirements will be implemented and enforced. Without such rules, confusion, endless challenges and muddled directives will stymie innovation rather than foster access. We believe that Section 4(I) provides the Commission with ample legislative authority to regulate in this area. Section 4(I) states in part that the Commission may "... make such rules and regulations, . . . not inconsistent with this Act, as may be necessary in the execution of its functions." Furthermore, Section 201 of the Communications Act also authorizes the Commission to "prescribe such rules and regulations as may be necessary in the public interest to carry out the provisions of this Act" with respect to common carriers.

III. Statutory Requirements

A. Coverage

1. Definition of "Telecommunications Service Provider"

The NOI at paragraph 8 seeks comment on whether the term "provider of telecommunications service" requires further clarification or definition in the context of Section 255.

The Telecommunications Act of 1996 attempts to embrace the dynamic and rapidly changing field of communications technology. As Commissioner Ness put it, "The new law deliberately blurs lines between formerly discrete sectors of the telecommunications industry. Bell Atlantic may become your long distance company, or your video service provider. MCI or AT&T may become your local telephone company, or your source for wireless services. Cox or Comcast may offer you broadband Internet access, or wireless local loop." (Remarks of Commissioner Susan Ness, the Public Policy Forum Series, The Wharton School of the University of Pennsylvania, Philadelphia, Pennsylvania, February 22, 1996) Chairman Hundt noted in the annual Report on the Disabilities Issues Task Force dated April 26, 1996: "Our nation is rapidly becoming an information society and new digital technologies are changing the face of our communications infrastructure. The new Telecommunications Act of 1996 has completely retooled the way in which our country will obtain and use its telecommunication services."

It is the convergence of computers, TV and telephony that has already altered the current understanding of the terms "telecommunications," and "telecommunications service." In keeping with Congress's intent to better serve consumers and to foster competition, new telecommunications networks and services will undoubtedly combine multiple functions and further blur the divisions between communications technologies. Services already exist which change analog transmissions into binary digits, voice-mail into fax (speech to text) or faxes into e-mail. As stated in Section 256(a)(2) the purpose of interconnectivity is "to ensure the ability of users and information providers to seamlessly and transparently transmit and receive information between and across telecommunications networks." Market competition and the Congressional intent to further the public interest requirement for access by persons with disabilities will require the Commission to alter the no longer valid separation of highly regulated telecommunications services (mere carriage of transmissions) and historically unregulated "enhanced" services which entail communications protocols and computer processing of the format. To express it differently, communications now take the form of bits, and bits are bits regardless of how they are transmitted between and among telecommunications users. After all, the new telecommunications landscape is supposed to foster competition and an end to unnecessary and outdated differentiation in treatment of technologies and services. We further note that as the Commission moves to embrace a broad view of telecommunications services which accepts the convergence of technologies, it also helps to further the important goal contained in Section 706(a) to bring advanced telecommunications capabilities to all Americans.

2. Definition of "Telecommunications Equipment" and CPE

In paragraphs 9 and 10 the NOI visits issues around the definitions of Telecommunications Equipment (TE) and Customer Premises Equipment (CPE). Comment is requested on the treatment of equipment that can be used with both telecommunications services and other services. In addition, further comment is requested on the distinctions between TE and CPE. Finally, commenters are asked to address the interplay of requirements under Section 255 and the duty required of carrier's under Section 251(a)(2) of the Act, not to install on their networks "features, functions, or capabilities" that are not accessible.

The use of computers to send data, as well as voice, video and images is now commonplace. In this context we believe that such devices are CPE and are therefore required to be accessible (with respect to their telecommunications function) under Section 255(b). This is an important consideration because the ongoing revolution in computers and software will enable increasingly portable and low-cost information appliances to harness powerful software and telecommunications network switching capabilities on an as-needed basis. The Commission must require that both the appliance and the network-based software, which is integral to the functioning of the information appliance, be accessible.

3. Manufacturers Subject to Section 255

In paragraph 11, comment is sought regarding the application of Section 255(b) in light of different accommodations that may be necessary for specific disabilities and with differing national equipment accessibility standards. The Notice asks if the Commission should give weight to the different standards confronted by a manufacturer with markets in other nations when considering what accessibility measures are readily achievable. Paragraph 12 of the Notice notes that because telecommunications equipment and customer premises equipment often consist of components manufactured by several different and possibly unrelated companies, the Commission seeks input in order to determine how to apportion responsibility among manufacturers. The Notice also asks for comment regarding the obligations of secondary manufacturers or resellers in situations in which manufacturers license their equipment design to other manufacturers for production.

Section 255 draws no distinctions among manufacturers. Regardless of their national affiliation or location, all manufacturers of telecommunications and customer premises equipment marketed or sold in the United States, must comply with the disability access requirements of Section 255. It is a simple matter of fairness, especially to manufacturers based in the United States, for all manufacturers to meet applicable technical and operational requirements. After all, domestic manufacturers must adhere to applicable standards and requirements in other nations where they intend to sell products.

With regard to the issues around components and secondary manufacturers, it seems clear that the requirements of Section 255(b) apply to all manufacturers whether or not they design, develop or fabricate each component for use in a covered telecommunications device. It is the final product, without regard to individual components, that must be accessible. Responsibility for access is shared among primary and secondary manufacturers. We expect that manufacturers and resellers, as well as primary and secondary manufacturers, will include accessibility in the licensing or other negotiations that take place before a product is marketed, and could by contract apportion liability among themselves, just as we presume they now meet other standards and requirements. Consumer complaints would likely be brought against the manufacturer whose name is on the telecommunications device or who marketed the device. It is the Commission's responsibility to enforce the provisions on all responsible parties. Joint and several liability with respect to the provision of providing access will ensure that the consumer's needs will be met, thereby meeting the goals of Section 255 will be realized.

With regard to the issues around diverse, international access standards or requirements, we note that telecommunications manufacturers and service providers already must contend with multiple standards if they intend to sell their products or services internationally. We also note that government and industry have worked for some time to harmonize international telecommunications standards. The Commission should encourage U.S. government agencies to seek harmonization of access requirements through multilateral agreements. However, the presence of multiple standards and requirements should in no way thwart the intent of Congress to bring about access to telecommunications technology for Americans with disabilities through the enactment of Section 255. We encourage telecommunications companies to take full advantage of the growing community of researchers working to improve access to communications technology for people with disabilities.

B. Requirements

2. Definition of "Readily Achievable"

a. ADA Definition

Comment is sought in paragraph 16 of the Notice regarding the factors to be considered in applying the ADA definition of "readily achievable" to telecommunications equipment and services. As the Commission points out in the Notice, constant changes in markets and the rapid pace of technological developments means that "readily achievable" is highly flexible - "an accessibility solution which is difficult or impossible to implement at one point may become an established, cost-effective technology a short time later."

The interpretation of this term must be comprehensive so that it applies across the diverse information technology industry, flexible in order to take into account changing circumstances, and narrowly targeted to prevent pernicious use of this exemption by companies resistant to disability access. We acknowledge that accessibility may not be "readily achievable" in some, hopefully rare, situations because of such factors as the current technical limits of a particular technology or the resources available to a company.

The wording of the access requirements in Section 255 is straightforward and the phrase "if readily achievable" is the only exemption or limitation on the accessibility obligation included in 255(b)-(d). The requirement to ensure access to and use of products and services by people with disabilities is an ongoing obligation placed on covered manufacturers and service providers. A continuing assessment on the part of industry accords well with the rapidly changing field of communications technology and ensures that innovations in technology and changes in market demands will result in the development of products and services whose access is "readily achievable." As Commissioner James H. Quello noted in a statement on the passage of the Act, February 1, 1996: "With its long-awaited rewrite of federal communications legislation Congress will enable the forces of technology and competition to combine to produce a host of new services that will create jobs and improve the lives of all Americans."

Specific aspects of the structure of telecommunications companies may influence the determination of what is readily achievable, e.g., regulated and unregulated lines of business, antitrust decrees, structurally independent divisions within a company. These structural issues may affect a company's overall capacity to ensure access for people with disabilities to its products or services. While specific legal limitations may affect the flexibility of a company, these structural anomalies must not be used to improperly shield a company from maximum efforts to achieve accessibility.

b. Costs; Financial Resources

Paragraph 17 asks about costs.

As with any technology, there are software and hardware components to be considered in estimating the cost to industry of providing access. Fortunately, many of the component technologies required to provide access to blind people are also desirable for the general market. This market force, coupled with the 20 year history of development in these technologies by specialty manufacturers, has, therefore, already significantly reduced the cost in the hardware components of these technologies. The following are just some examples of this current market trend:

- In 1980 a "reading machine" costing upwards of $20,000 was marketed to read printed materials for blind people. The unit provided sophisticated OCR and speech synthesis technology, but no provision to store the scanned text--except to audio cassette in analog, audio format. Today, far more sophisticated versions of that early technology are commonly available for well under $1,000, and are routinely used by disabled and non-disabled individuals alike in offices throughout the world to turn a printed page into text which can be imported into a spread-sheet, database, or a word-processor--spell-checked, and otherwise manipulated for a multitude of personal and business uses;

- Speech recognition technology, only recently the specialized assistive technology for persons unable to use keyboards or pointing devices, is today bundled in IBM's OS/2 computer operating system--at no additional cost to the buyer of OS/2;

- Word prediction technology, only recently the assistive technology for persons who can not speak and who use a keyboard or pointing device only with great difficulty, is now bundled with the upcoming release of Microsoft's Office 97--at no additional cost;

- The DEC-Talk speech synthesizer, long the most preferred synthetic speech generating device among blind people, currently retails at prices above $1,000. The same technology, however, is bundled in Creative Audio Labs' Sound Blaster AWE32 sound card--the standard for the computer industry--at a street price of about $210 for the complete Sound Blaster package;

- Perhaps the most significant industry development promoting lower costs for providing access to disabled people is Intel Corporation's soon to be released MMX family of Pentium processors. The speech generating capabilities of the Sound Blaster and the DEC-Talk, together with other beneficial technologies, are capabilities now being supported and made inherently available in the CPU, the very heart of all digital technology, rather than as add-ons.

We think it useful to note that a parallel example exists in recent history. Before the provisions of the Television Caption Decoder Circuitry Act of 1988 took effect, caption decoding devices utilized by deaf people cost upwards of $300 each. The cost of this same technology, now required by law to be part of every television set sold in the United States (with a screen size of 13" or greater) is now under $1. There is every reason to expect the unit cost in these technologies to drop by several orders of magnitude as a result of appropriate, well-considered regulations from the Commission implementing provisions of Section 255.

Further evidence that what was once niche technology is now part of the mainstream is contained in a recent *USA Today* interview with Bill Gates, cofounder and CEO of Microsoft. When asked what his business would be like in ten years, Gates replied: ""We're in four businesses now, and ten years from now, we'll be in the same four businesses. First is the PC operating system. In ten years, a lot of that will be speech recognition, speech synthesis, and vision. It's our second biggest business and probably still will be." (interview, *USA Today*, October 14, 1996, p. 4B)

In responding to questions about the cost of accessible design, it seems worth noting that for people who are blind or visually impaired, access to telecommunications technology requires principally two considerations:

- alternative output (usually audio or enhanced visual display) of information on video or LCD screens; and,

- the ability to control the functions and features of a device or network service through an interface which does not require vision to use, (usually through a keyboard or voice activation).

To ensure accessibility, manufacturers of telecommunications devices must incorporate alternatives to visual output and "eye-hand" dependent control/input, and providers of telecommunications services may need to incorporate modifications into electronic data structures to enable graphic-images and video content to be accessed and interpreted by someone who cannot see the graphic or video material. Some likely accessibility considerations include:

- incorporating alternative output options including text-to-speech algorithms, audio output capacity and adjustable visual displays into various types of telecommunications appliances and networks;

- providing text, audio or some other accessible alternatives for visually-oriented electronic data formats such as graphics, video or virtual reality;

- adding alternative input/output ports and communication protocols (e.g., infrared) to a wide spectrum of telecommunications appliances in order to interface with specialized equipment used by people with disabilities; and

- including accessible input/operation approaches such as voice-input or tactile keypads in communications technology, or providing specialized peripherals to customers who need such access.

Several issues are raised in paragraphs 18-20 concerning the assessment of the financial resources of telecommunications service and equipment providers. In paragraph 18, the Commission notes that covered entities have widely varying financial resources which, if considered, should not distort competition, and should ensure accessibility. In paragraph 19, the Commission seeks comments regarding whether the references in the definition of "readily achievable" to "overall financial resources" of "the facility or facilities" or "the covered entity" require that the entire operations and resources of a parent corporation and its subsidiaries must be taken into consideration. Finally, paragraph 20 of the Notice revisits issues raised in paragraph 11 concerning the design and development of services or equipment for both foreign and domestic markets in which regulatory requirements may differ.

As we noted above in the brief discussion of universal design, we believe that telecommunications devices and services that are accessible to people with disabilities will also be more competitive overall. However, some representatives of the industry express concern that adding accessibility into the design of products and services may add more cost than the market will bear.

In guarding against the inappropriate use of the "readily achievable" exemption, it is essential that costs and resources required to achieve disability access be measured accurately and allocated fairly. The Commission must ensure that only those expenses actually incurred by covered manufacturers and service providers in efforts to achieve accessibility are measured. Likewise, complementary or corollary benefits resulting from disability access, e.g., improved design, usability or functionality for all customers should also be measured so that these "value added" factors are weighed against the accessibility costs in the ultimate determination of what actions are "readily achievable."

3. Definition of "Accessible to," and "Usable By"

In paragraph 21, the Commission seeks input regarding the terms "accessible to" and "usable by". Paragraph 22 contains a query regarding whether access for particular disabilities may be satisfied through access to only a portion of product or service offerings. And, paragraph 23 of the Notice asks commenters to describe the current and projected state of access to telecommunications technology.

In responding to paragraph 21, we understand that each term was included in the disability access language because both physical access and user operation are essential for an individual with a disability to have an equal opportunity to use a product or service. This language from the ADA was included in the Telecommunications Act.

In responding to paragraph 22, we find no disability-based distinctions in the language of Section 255. A manufacturer or provider must take action to ensure access throughout the range of covered services and equipment, if readily achievable. Otherwise, individuals with certain disabilities may never gain access to the wide range of telecommunications technology which will be deployed.

In addition, AFB urges the Commission to guard against policies or rules which would result in disability access being available only in "high-end" products and services. A significant number of individuals with severe visual impairments are classified as being at or close to the federally defined poverty threshold. According to census data regarding people 15-64 years old, 13 percent of those with no disability are below the low-income threshold while 22 percent of those with a disability and 30 percent of those with a severe disability are below this threshold. Among people 15-64 years old who report they have difficulty seeing the words and letters in ordinary newsprint even when wearing glasses or contact lenses, 24 percent are below the low-income threshold. Among those who report that they are unable to see the words and letters at all, 30 percent are below the threshold. (McNeil, John M., Americans with Disabilities, 1991-92, U. S. Bureau of the Census, Current Population Reports, P70-33, U.S. Government Printing Office, Washington, D.C., 1993, Table 9.)

Finally, the Commission refers to modular design which we believe may be appropriate as a means of providing access and upgrades.

In responding to paragraph 23, we are opting, at least in initial comments, not to list specific products and services. Rather, we have outlined a series of common access problems found in categories of telecommunications technology.

Telecommunications Devices

Telecommunication devices increasingly rely on eyesight to access visual displays or to operate the equipment. Alternative forms of access are rarely included. Here are a few examples:

* Telephones or fax machines with video menus or LCD displays;

- Telephones or fax machines with signal lamps, flat panel keypads, or "soft" programmable keys, without alternative programming options from a tactually discernible numeric keypad;

- Personal communication devices using touch-screen or pen-based input mechanisms;

- Information kiosks, ATM machines, point of sale terminals, and "smart card" technologies employing visual displays and/or touch-screen interfaces;

- Home security systems using visual cue touch pads; and,

- Television and cable set top box systems that are operated with "point and click," remote control, and on-screen interactive menus that provide the user with only visual feedback.

Services

Communications services can present similar barriers to blind or visually impaired people who cannot read visual displays, discern graphic icons, perceive visual elements of video programming, or use interactive "point and click" menu mechanisms as a user interface:

- CD-ROM or network-based multimedia information systems, now deployed widely in classrooms and work settings, that rely on static or animated graphics for control and navigation and do not employ verbal descriptions of icons; similarly, there is no audio description of the visual elements of video programming included in these multimedia information services; and,

- Electronic documents stored in graphic "bit-map" images which cannot be easily translated into text, necessary for text to speech conversion.

Public Switched Network

Even telecommunications networks may include functions and features which are not accessible or usable without sight:

- Visual read-out Caller ID;

- Magnetic card readers or "smart cards" used to control public telephones; and,

- Digital compression technology which may strip out elements like video description.

4. Compatibility

Paragraphs 24 and 25 refer to assistive or "specialized . . . equipment" used by people with disabilities. The language is drawn from the Act, and ensures that if direct accessibility to mainstream information technology is not readily achievable, then indirect access through assistive technology must be considered. The Commission is seeking comments on the types of assistive technology used by people with disabilities for telecommunications and what is needed in the design of mainstream technology to ensure an effective interface between assistive and mainstream technologies.

Rather than list specific devices used by individuals with disabilities to gain access to telecommunications technology intended for the general market, we suggest an approach which makes reference to the familiar territory of open architecture. In this way, manufacturers would provide a universal port which would allow data to be transferred to a separate, accessible device. The accessible peripheral device would, for example, provide the speech output which is absent in the host device. Currently, devices such as the Braille 'n Speak®, a portable notetaker with speech output, has been interfaced with a variety of devices in order to provide verbal access to information on a visual display. Accordingly, devices such as blood glucose meters, frequency counters, and volt ohm meters are now accessible to blind persons using peripheral devices such as the Braille 'n Speak®. Similarly, service providers should consider providing text, audio or some other accessible alternatives for visually-oriented electronic data formats such as graphics, video or virtual reality.

C. Network Features, Functions and Capabilities

Paragraphs 26 and 27 of the Notice seek clarification of the application of Section 251(a)(2) which places on each telecommunications carrier a duty "not to install network features, functions or capabilities that do not comply with the guidelines and standards established pursuant to Section 255 or 256."

The phrase "features, functions and capabilities" is not well defined in the statute. It is incorporated into the definition of Network Element at Section 3(a)(2)(45) of the Act.

> "NETWORK ELEMENT.--The term network element means a facility or equipment used in the provision of a telecommunications services. Such term also includes features, functions, and capabilities that are provided by means of such facility or equipment including subscriber numbers, databases, signaling systems, and information sufficient for billing and collection or used in the transmission, routing, or other provisions of a telecommunications service."

Because this phrase is included in Section 251 rather than Section 255, it suggests Congressional intent to support broad interpretation of the range of telecommunications services which must be accessible to people with disabilities. The phrase "features, functions and capabilities" is expansive and captures advanced services. Since the duty applies to telecommunications carriers, the access requirement extends to the maximum range of telecommunications services made available throughout the telecommunications infrastructure.

Some examples might include device connection protocols, speech-to-text or text-to-speech and software-based control mechanisms which provide the means for accessing and manipulating network services. Carriers must also ensure that they do not prohibit access to telecommunications or other services deployed on their networks. For example, if a provider opts to provide equivalent text-based service along with its graphic-based interface, a carrier should be required to permit the user to access the text-based service. In addition, a telecommunications carrier should be prohibited from installing a feature, function or

capability which hinders access to services by people with disabilities, e.g., digital compression technology which inadvertently strips out data such as video description.

IV. Implementation and Enforcement

A. Resolution of Complaints

In paragraphs 28-34 of the Notice, the Commission has outlined three possible scenarios for enforcement of Section 255: complaint-by-complaint, policy or regulations. Commenters are asked to provide input on such issues as the relationship of obligations placed upon service providers and equipment manufacturers, the allocation of responsibility among covered entities, favorable showings by defendants to a complaint, exemptions for small entities and the advisability of service-specific requirements.

As we stated earlier, AFB strongly endorses the need for the Commission to issue clear, comprehensive, flexible and future-oriented rules as critical and necessary to ensure implementation of Section 255. We note that Section 255 does not require nor does it prohibit the Commission from issuing such regulations. We also recognize that in passing the 1996 Act, Congress wished to bring an end to unnecessary regulations and limits on competition. However the language of Section 255 is both imperative and direct, and Congress would certainly have added a paragraph to the Section limiting the Commission's regulatory authority had it wished to do so. In other words, if Congress had wished to limit Commission discretion to vigorously implement this Section as a matter of public interest, it would have specifically prohibited the Commission from exercising its regulatory authority such as that granted in existing Sections 4(I) and 201 of the Communications Act. Ultimately, Commission regulations will ensure that all covered manufacturers and service providers compete on a level playing field and that accessibility for individuals with disabilities is considered a priority by the private entities that are constructing the emerging National Information Infrastructure.

AFB believes that a complaint-by-complaint process would thwart the intent of Section 255. Such a process, would prove to be extremely inefficient and cumbersome for consumers, industry and the Commission, and would likely minimize initial proactive industry action to provide accessible equipment and services. Complaints to the Commission will be a critical element in the implementation of the disability access provisions, but Congress clearly intended the language in Section 255 to require early and ongoing initiative by the telecommunications industry as evidenced by references to the design, development and fabrication of equipment and the requirement on industry to ensure that their products and services are accessible.

Commission policy and voluntary guidelines would be better than no guidance at all, but it would still lack the imperative directness that is necessary to ensure that accessibility is embraced as a serious and important national goal for telecommunications technology. We are concerned that any Commission action short of rulemaking would suggest that disability access is a lesser priority than other requirements placed upon manufacturers of telecommunications equipment or providers of telecommunications services.

The prospects are promising for the establishment by the Commission of clear, comprehensive and not unduly burdensome rules to implement access requirements. In particular, we refer to the encouraging dialog taking place between representatives of the telecommunications industry and the disability community. These discussions are occurring under the auspices of the Telecommunications Access Advisory Committee (TAAC) established by the United States Architectural and Transportation Barriers Compliance Board (Access Board). These discussions have already been very fruitful in helping both industry and the disability community to better understand each others needs and interests. We believe these discussions can lead to constructive proposals for a compliance process and set of guidelines which could be finalized through the Commission's rulemaking process.

The goal of Section 255 and of the related provisions in Section 251(a)(2) and Section 256(b)(B)(2) will be best demonstrated by the presence in the competitive market of telecommunications devices and services that are accessible to and usable by individuals with disabilities. The design guidelines established by the Access Board will likely be of tremendous assistance to industry in complying with the access requirements. Nonetheless, in handling complaints brought under any of the above cited Sections, consumers, industry and the Commission will find it beneficial to set forth a series of steps or procedures which, if followed by industry, should result in compliance with disability access requirements. Ultimately, it is the outcome of access by people with disabilities that matters most. A set of procedures is only a guide or a series of defenses which may be cited in responding to a complaint alleging inaccessibility.

The TAAC has already spent considerable time discussing various processes which may be followed by industry to foster the development of accessible telecommunications devices. It is quite likely that critical procedures that are effective in the context of the manufacturer of telecommunications equipment and CPE can also be implemented and enforced for service providers. In fact, setting forth applicable procedures for manufacturers, service providers and areas of overlap between manufacturers and providers accords the Commission with yet another key justification for undertaking a comprehensive rulemaking on Section 255.

Although we are not prepared at this point to offer a complete set of procedures which could be used to investigate compliance with Section 255, certainly implementation activities would be necessary during all stages of product or service design and development through marketing, customer support and product/service revisions. Specific steps which covered manufactures or service providers might undertake to demonstrate implementation of the disability access requirements would likely include measures such as: an overall product/service accessibility plan, specific research to identify disability access solutions, involvement of disability access expertise, an explanation of the readily achievable factors involved if access could not be achieved, a plan for compatibility , an explanation of factors if compatibility is not readily achievable, accessibility verification or testing procedures, customer support for access features and management supervision of and commitment to access efforts. While a Declaration of Conformity (DOC) process might be desirable, such a DOC could not stand on its own as proof of accessibility efforts or as a defense to a complaint alleging inaccessibility. Finally, we note that the work of the TAAC suggests the value of formal or informal industry-consumer panels to develop access requirements, standards and

procedures. However, such entities must not be a substitute for Commission enforcement of Section 255.

B. Developing Equipment and CPE Guidelines in Conjunction with the Access Board

In paragraph 35 the Commission asks how it should proceed with respect to the equipment guidelines being developed by the Access Board.

AFB supports an action similar to that taken by the Departments of Justice and Transportation under the ADA, in which the Commission would adopt the guidelines established by the Access Board. The recommendations to be used by the Access Board in establishing its guidelines are being drafted by a disability-industry advisory committee. As we noted in our response in the previous section, the dialog now taking place in this Committee is very useful to both industry and the disability community.

C. Complaint Procedures.

In paragraphs 36-40 the Notice seeks comments on several issues regarding the disposition of complaints. Commenters are asked to address the interplay of Sections 207, 208 and 255(f) of the Communications Act with respect to complaints, as well as the interplay of access obligations of manufacturers and service providers. Comment is also sought on complaint procedures.

AFB believes that Section 255(f) clearly requires the Commission to carry out the enforcement of Section 255 provisions on all covered entities, both manufacturers and service providers. In addition, complaints under Section 208 against common carriers continue to be authorized, and such complaints may allege noncompliance with Section 255. Finally, we note that nothing in the Telecommunications Act prohibits the filing of complaints under Section 207 alleging violations of disability access requirements under Sections 251 or 256.

Since Congress did not specifically provide a private right of action under Section 255, it is critical for the Commission, in its sole enforcement capability, to regulate under Section 255. The Commission, has a duty to provide guidance to carriers who must comply with the nondiscrimination provisions under Sections 207 and 208 of the act, since in our view it is discriminatory to develop a network or services that do not provide access to persons with disabilities. In addition, the Commission may investigate a complaint on its own motion pursuant to Section 403 of the Act. Congress surely must have intended that the Commission should follow both policy and procedural regulations in carrying out this responsibility. In setting forth complaint procedures to enforce Section 255, we note that covered entities possess most of the information that will be critical for the investigation and disposition of a complaint. Only the manufacturers and service providers will be in a definitive position to show the validity and relevance of various access solutions with respect to their particular product or service. Therefore, complaint procedures should recognize that the burden of proof must lie with covered entities to show a consideration of all feasible alternatives and present clear and comprehensive arguments for the actions taken with respect to disability access.

We also note that certain defenses would be insufficient as a response to a complaint alleging that a product or service is inaccessible. We have already argued that a DOC, if one were required by the Commission, could not stand on its own as proof of a defendants action to implement accessibility. Second, per unit cost would not be sufficient as a sole defense to a complaint under Section 255. We note that the history of technology innovation demonstrates that per unit costs decline dramatically as a market is developed.

In addition, the cost of features or functions which enhance the value or usability of a product or service for consumers *without disabilities* should not be included in the calculation of a manufacturer's or service provider's readily achievable defense under Section 255. We urge the Commission to establish a timetable for the investigation and disposition of complaints brought under Section 255. Since complaints can be brought against common carriers under either Section 208 or Section 255, we suggest parity in the disposition of complaints between the two sections. Accordingly, procedures should be issued to require the Commission to provide for disposition of complaints brought under Section 255 within five months as is required for complaints brought under Section 208.

THE WALL STREET JOURNAL.

MARKETPLACE

WEDNESDAY, AUGUST 14, 1996

TECHNOLOGY

Computer Icons Block Access for the Blind

By AUDREY CHOI
Staff Reporter of THE WALL STREET JOURNAL

Cynthia Ice thought she had a promising career at Lotus Development Corp. With an advanced degree in engineering, she was an adept troubleshooter at the software company, helping users navigate Lotus 1-2-3 and other products.

Ms. Ice is blind, but she was able to do her job as well as any sighted worker, thanks to the array of technological aids like Braille printers and screen readers, which convert text on screen into synthesized speech.

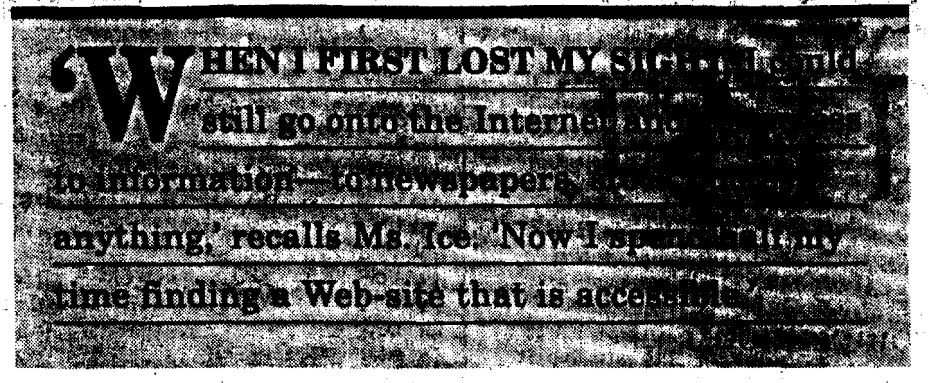
Then came Windows.

With its extensive use of graphics, tool-bars and picture-driven instructions, **Microsoft** Corp.'s operating system dealt a devastating setback to blind computer-users. Their DOS-based screen readers were useless, often just saying "icon" or "picture" when confronted with a graphic on the screen.

"All of a sudden, it was like going back to the days when I first lost my vision and everything was frustrating," says Ms. Ice, who lost her eyesight due to complications from diabetes. She managed to avoid Windows in her job for a while, but as it became more dominant in the work world, that became more difficult. She left Lotus last June after nine years with the company and is unemployed.

An estimated 120,000 people in the U.S. have no vision and about 1.1 million are legally blind. In addition, there are roughly four million working-age Americans who say they can't see well enough to read ordinary print even when wearing glasses and would require screen readers and enlargers to be part of the labor force.

Technology once opened doors for visually impaired people. But the transition to picture-driven technology has closed some workplace opportunities again. On-screen graphics aren't the only problem. Graphics are being used increasingly in public information kiosks, cellular phones, cash machines, and even microwave ovens, stereos and other common consumer electronics.



"Every time we go into Brookstones, there are fewer and fewer things my wife and I can use," says Doug Wakefield, who is blind and who works at the Center for Information Technology Accommodation. "People who think Windows is a problem ain't seen nothing yet," he says.

The Internet, for example, once gave the blind access to the world's text-based libraries. But it has been transformed in recent years into a showplace of snazzy video clips and pictures, where Web pages often can only be retrieved by "drilling down" through a number of graphics, a task that's nearly impossible for blind users.

"When I first lost my sight, one of the best things about the computer was that I could go onto the Internet and get access to information — to newspapers, stock quotes, anything," Ms. Ice says. "Now I have to spend half my time finding a Web site that is actually accessible," she adds.

Other visually impaired workers have faced similiar setbacks. Joseph Lazarro had a thriving career as a free-lance writer, reviewing computer software for Byte Magazine. "With my DOS screen readers it was so easy to use and test all the new software products that many of my editors didn't even know I was blind," Mr. Lazarro says. But he had to stop when the advent of Windows meant he was barely able to run new software, let alone review it. Now he works at the Massachusetts Commission for the Blind, trying to make more workplaces suitable for the disabled.

Advocates for the blind say that making technology accessible need not be prohibitively costly or difficult — if developers include the features as part of the original design. While equipping a television with closed-captioning used to cost hundreds of dollars when it was added later by deaf viewers, it costs just a few dollars now that

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Blind Computer Users Complain Graphics Defeat Their Efforts

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the capability is built in to all new televisions. Similarly, making software programs accessible to the blind requires a few simple modifications, such as remembering to include a line or two of text description whenever there is an icon.

Microsoft officials acknowledge that they did not originally include such text descriptions with Windows. They say they wanted to leave opportunities open for independent software developers to build the tools. But Microsoft compounded the problem by not establishing clear programming standards for all software developers. As a result, a screen reader might work with one Windows application, but not another.

"With every evolution of software, the adaptive things out there broke," concedes Gary Moulton, a product manager for disability solutions at Microsoft. "Folks with disability really began to fall behind," he says.

Apple Computer Inc. initially encountered similiar problems when it introduced the graphics-based Macintosh, but because it never dominated the workplace as much as Microsoft, it was easier for blind users to find alternatives. Apple later helped a software developer produce a screen reader that works well with Mac computers.

In recent months, Microsoft has taken steps to improve the accessibility of Windows products, Mr. Moulton says. Six people now work on accessibility issues—instead of just one. And a package of software tools to enable accessibility features—codenamed ActiveX Accessibility—is now being tested by blind users. But there is no timetable as to when those aids will be included in commercially available versions of Microsoft products.

"Microsoft has done a great deal of work and there should be a breakthrough in the next year or so," says Charlie Crawford, director of the Massachusetts Commission for the Blind. "But for people trying to keep their jobs, it's like telling a cancer patient, 'just hang on for a few more months, and maybe a cure will come along,' " Mr. Crawford says.

Advocates for the blind also are eagerly monitoring the development of the programming language, Java, and software "applets," in the hope these new tools will make the Internet more accessible to the disabled. "Things are changing so fast, you can't just keep patching them," says Gregg Vanderheiden, director of the Trace Center, a research center that encourages technology developers to build in accessibility features from the beginning, rather than as an afterthought.

Several federal statutes now require government agencies to buy accessible technology. The Social Security Administration, for example, is awarding a contract for computer hardware and software systems that must accommodate disabled employees. For Peter Read, who is blind, it's about time. Once one of the agency's most technologically adept, Mr. Read says he has been lagging behind his coworkers as he clings to his old DOS applications.

"It's like being in a footrace with someone faster than you," he frets. "They keep going, and you're falling behind faster all the time."

GETTING SHUT OUT BY WINDOWS:
Visual nature of popular computer program proves a threat to blind workers
Boston Globe Newspaper
October 17, 1994
by Michael Putzel of the Globe staff

Jamal Mazrui had learned a lot about computers and information management software in four years on the job at Harvard's John F. Kennedy School of Government. So when he was asked, he jumped at the chance to design a new system for another department. Then he ran into Windows.

Mazrui is blind. He became a specialist in his field using machines that let him hear what he can't see. Those machines read words displayed on a computer screen, but they can't help him point with a mouse and click on the icons and boxes displayed on computer screens running software called Microsoft Windows.

"It looked like things were go" for Mazrui's project, using a popular database software package that works without Windows, the thirty year old Somerville man recounted recently. Then the people who had approached him heard about Microsoft Access, a database program they were told would be easier for workers in the department to use. Access, however, is a Windows-based product. "They opted to go with it and hire an outside consultant to develop this for them," Mazrui said, adding that his own job eventually will have to be restructured because the school's computer services department has recommended that Windows be adopted throughout the school. The great selling point of Windows, the operating system that has revolutionized computing in corporate America, is that, in general, it is easier to use than systems requiring the user to learn and type in sometimes cryptic commands. To thousands of blind workers who can't see the graphic images on the screen, however, Windows has become not just an obstacle, but a threat. "The blind community is at the highest risk right now of being first liberated by computers in the eighties and now enslaved in the nineties." Said Charles Crawford, Massachusetts Commissioner for the Blind.

Jeffrey Turner, a systems analyst for John Hancock Financial Services in Boston, who also is blind, said the widespread adoption of Windows in his office and others around the country "is just killing us."

Turner has been writing computer programs for his company for nearly ten years and said John Hancock has spent more than ten thousand dollars for the special equipment he needs to do his job despite his blindness. But Turner is now the only person in his department who is not linked to his colleagues by a local area computer network. He can't use the E-mail system the company is adopting, nor does he work in Microsoft Word, the standard word processing program used by his colleagues. They operate under Windows. "I'm locked out of it all," Turner said. The blind "are going backwards with technology advancing." Turner has spent his career working with mainframe computers, which use text commands and computer language he understands. But the company's development efforts are concentrated on smaller, Windows-based machines, and he can't work on the most challenging new projects.

"When they look at who they can consider for these positions, the cherries of the project, they couldn't consider me because I don't have access to Windows," Turner said. Several companies produce software designed to read the information on a Windows screen and translate it into audible speech. The programs do help some users who run relatively modest programs. But Mazrui, Turner, and numerous blind users with considerable computer expertise said the screen-reading programs tend to "get lost" and misinterpret icons or information displayed in boxes on the screen. "Despite the best efforts of a number of manufacturers to make this environment accessible to persons who are blind, it has been a well intentioned but dismal failure," Crawford said.

In their book "Solutions; Access technologies for people who are blind," produced locally by National Braille Press, Olga Espinola and Diane Croft compare the development of graphical computer environments to dropping a guillotine on blind users. "The technique of choosing from among pictorial images, called icons, in lieu of words, has been a deadly development" for the blind, the authors wrote. An illustration of the problem blind users face shows equally well why the graphical environment has proven so popular outside the blind community. "Instead of seeing the word "mailbox" on the computer screen, for example, you'll actually see a picture of a mailbox," explained Espinola and Croft, both of whom are blind. "You can point your mouse to the mailbox, click the button, and presto, the mailbox opens up and you can read messages people have left for you." The key, of course, is being able to find the mailbox on the screen.

The Sensory Access Foundation, in a review of screen-reading programs that attempt to translate the information displayed on a Windows screen into audio for blind users, characterized the situation as a "nightmare."

Although IBM has made great strides with it's screen reader for the company's OS/2 operating system, the reviewers said, similar programs for Windows have serious problems, either because they are unreliable or because they don't work with some of the most common Windows programs.

The biggest problem for developers of screen-reading software, the reviewers said, is that programmers have few standards that would make it easier to write programs for the blind, and where standards do exist, the programmers frequently don't follow them. Nick Dotson of Pensacola, Florida a pioneer of finding ways for the blind to use CD-ROM and multimedia technology, said the problem is not confined to Windows itself but extends to many programs designed to run under Windows. Microsoft's own programming groups don't follow corporate guidelines in writing computer code that a screen reader can follow, Dotson said, and it is, therefore, impossible to impose any discipline on other software developers. Greg Lowney, Microsoft's senior program manager for dealing with issues affecting the disabled, acknowledged that the computer industry overlooked the implications of moving to the graphical Windows environment. But the blind community also ignored the issue initially, he said, because it wasn't apparent when Windows was introduced four years ago how quickly the new system would supplant the old. The company now is working with developers of adaptive hardware and software to give them the technical information they need to design aids for the next version of Windows, which is due out in 1995. But Lowney admitted the new product, to be called Windows 95, will not contain sufficient code of it's own to make future Windows-based programs accessible to the blind.

Jennifer Simpson, a Washington lobbyist who serves on a technology task force of the National Consortium for Citizens with Disabilities said it is difficult to legislate a solution. "We don't want to lock into any one technology," she said, because that could impede progress. Simpson added, however, that making new programs and devices accessible is critical to millions of disabled people, "and nobody's thinking about this stuff, which is what it boils down to."

Joseph J. Lazzaro, another author of a book on adaptive technologies, said blind people "are having many of the gains we have achieved over the last ten years taken away, and the chief culprit is Microsoft Windows." Lazzaro said he doesn't expect to use drawing or visual art software on his computer but programs like Windows that use graphical images in place of written commands are not inherently closed to the blind. By building "hooks" into the computer code to identify graphic images in words as well as pictures and by setting strict rules for programming where boxes appear up on the screen, Microsoft could make Windows accessible to the blind, Lazzaro said. "These are computers," he added. "It's not like trying to get a stone statue to talk."